REMARKS

Assignee thanks the Examiner for allowance of claims 25, 26, and 50 and the indication that claims 3-24 are drawn to allowable subject matter. Assignee responds to the rejections of claims 1, 2, 27, 28 by respectfully requesting reconsideration, for the reasons stated below.

For ease of examination and cost reasons, assignee had previously presented only independent claims 1, 25, 27, 28, 34, 41. Now that those claims have been allowed or appear allowable, assignee has added counterpart claims, such as "means plus function" and apparatus versions of method claims or method counterparts of apparatus claims, and certain dependent claims. Thus, applicant has here "added" claims 52-73, but those should be easily examined with the claims already examined.

For the Examiner's convenience, the following table lists the pertinent method claims that were examined along with the counterpart claim(s). In addition, where the counterpart claims were in the original application but canceled by preliminary amendment, the original claim number is presented.

Independent Method Claim	Counterpart(s)	Original Claim
1	27 *(m+f)*, 71 *(system)*	27 *(m+f)*
28	55 *(system)*, 56 *(m+f)*	32 *(system)*, 33 *(m+f)*
34	61 *(apparatus)*, 62 *(m+f)*	39 *(apparatus)*, 40 *(m+f)*
41	68 *(apparatus)*, 69 *(m+f)*	48 *(apparatus)*, 49 *(m+f)*
50	72 *(m+f)*, 73 *(system)*	51 *(m+f)*

"CALIBRATION SIGNAL USAGE" CLAIMS

Claims 1, 2, 27, 28 stand rejected as obvious over U.S. Patent 6,134,261 to Ryan in view of U.S. Patent 6,625,222 to Bertonis *et al.* Assignee respectfully traverses the rejection.

Independent claims 1, 27 call for comparing a first set of samples provided from a frequency translated, multi-tone calibration signal with a second set of samples

"modeled by a function of parameters including an estimated vector mismatch and a plurality of basis functions" (emphasis added). A value of vector mismatch that minimizes the difference between the two sample sets is determined, at least to an estimate, resulting in a determination of mismatch across a range of frequencies. Independent claim 28 calls for minimizing the difference between a first sample set like that of claims 1, 27 discussed above and a second set of samples "derived from a second signal path through an adaptive filter having a set of adaptable coefficients" (emphasis added).

Ryan and Bertonis *et al.* do not meet the limitations of those independent claims for the following reasons.

First, Ryan and Bertonis *et al.* do not teach or suggest any comparison between a calibration signal (frequency translated or not) and any set of samples that are modeled (claims 1, 27) or derived through an adaptive filter (claim 28). Rather, Ryan compares two actual signals, a first calibration burst at a first antenna element of a base station and a second calibration burst at a second antenna element of the base station (see FIG. 2; C8/L34-57). The Examiner has cited Bertonis *et al.* only for its teaching about frequency translation and, in any event, Bertonis *et al.* does not teach or suggest anything about calibration at all. For that reason alone, claims 1, 27, 28 are allowable.

Second, the Examiner has pointed out a distinction between the invention of claims 1, 27, 28 and Ryan, namely that those claims call for comparison of frequency translated samples of a received RF calibration signal with samples that are modeled by a function of parameters or derived through an adaptive filter, while Ryan employs calibration bursts transmitted from two separate antenna elements, which involves comparison of two signals that are already at RF frequency. The rejection seeks to cure that deficiency by supplementing Ryan with the disclosure of frequency translation in Bertonis *et al.* However, it would not have been obvious to one of ordinary skill to apply Bertonis's frequency translation in Ryan's system because Ryan's compared signals are already at RF frequency and need no frequency translation. There is no teaching or suggestion in Ryan or Bertonis *et al.* of using a calibration signal that is not conveyed by an actual received signal.

The rejection suggests that a motivation for modifying Ryan's apparatus with frequency translation might be to "minimize spreading and enhance transmission of signals." However, using frequency translation would not accomplish those goals.

Accordingly, independent claims 1, 27, 28 are allowable along with their dependent claims 2-24, 52-54. Similarly allowable are newly resubmitted independent claims 55, 56 (formerly 32, 33, respectively). Like claim 28 discussed above, claims 55, 56 both call for comparison of samples from a received calibration signal with samples derived through an adaptive filter having a set of adaptable coefficients.

Claim 2 also stands rejected as obvious over Ryan in view of Bertonis *et al.* That claim further calls for the signal paths to include an in-phase signal path and a quadrature signal path. In claim 2, the vector mismatch generally recited in claim 1 specifically includes deviation from a quadrature relationship between the in-phase signal path and a quadrature signal path. The rejection purports to find the added limitations of claim 2 in Ryan. However, Ryan's disclosure of quadrature signal components in a calibration signal does not teach or suggest anything about the claimed mismatch determination between quadrature signal paths. Accordingly, claim 2 is independently allowable.

"CALIBRATION SIGNAL GENERATION" CLAIMS

Independent claims 34, 41 also stand rejected as obvious over Ryan in view of Bertonis *et al.* However, the rejections of those claims are unsupported by any showing that either reference teaches or suggests their subject matter, separately or in combination. Indeed, the Office Action provides no discussion of those claims at all and simply includes the claim numbers in lists of rejected claims.

Claim 34 calls for a phase-synchronous calibration signal generating method, in which a local oscillator signal and a baseband calibration signal are generated. The signals are coupled to a mixer to provide an RF calibration signal. The RF calibration signal is in turn coupled to one or more mixers that, during operation, translate the RF calibration signal, using the local oscillator signal, to at least one baseband calibration signal. Neither Ryan nor Bertonis *et al.* disclose the use of the same local oscillator for

providing a radio frequency calibration signal from a baseband calibration signal as for translating the radio frequency calibration back to a baseband calibration signal. Accordingly, claim 34 is allowable along with its dependent claims 57-59 and its apparatus and "means plus function" counterparts, claims 61, 62.

Claim 41 as amended calls for translating a calibration signal to one or more reduced frequency calibration signals and is allowable, along with its dependent claims 63-66, over Ryan and Bertonis *et al.* for the reasons discussed above with respect to the "frequency translating" limitations of claims 1, 27, 28. Claims 67, 68, which are apparatus and "means plus function" counterparts to claim 41, are likewise allowable.

CONCLUSION

Assignee respectfully requests allowance of all pending claims. Please feel free to telephone the undersigned if it would in any way advance prosecution of this application.

Respectfully submitted,
NDSU RESEARCH FOUNDATION
by its representative

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